

**What is claimed is:**

1. A digital TV receiver, comprising:

an A/D converter for converting an analog signal into a digital signal;

5 a carrier recovery for converting the digital passband signal into a digital baseband signal; and

a symbol clock recovery for converting digital real/imaginary baseband component signals into OQAM type of real/imaginary component signals, detecting timing error information by high-passband-filtering, squaring, and adding the OQAM real/imaginary signals, and for  
10 generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information.

2. The digital TV receiver of claim 1, wherein the A/D converter converts the analog passband signal into a passband signal by sampling the analog signal at a fixed frequency

15 generated from the fixed oscillator or at least two times the frequency of the symbol clock.

3. The digital TV receiver of claim 2, wherein the fixed frequency generated from the fixed oscillator is higher than the at least two times the frequency of the symbol clock.

20 4. The digital TV receiver of claim 1, wherein the carrier recovery multiplies the digital passband signal by a standard carrier signal through the carrier recovery process for converting the signal into the digital baseband signal.

5. The digital TV receiver of claim 1 further comprises a resampler for resampling the digital real/imaginary baseband signals to at least two times the frequency of the symbol clock frequency, and interpolating each of the signals.

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6. The digital TV receiver of claim 5, wherein the symbol clock recovery comprises:  
an OQAM converter for converting each of the digital baseband real/imaginary signals interpolated and outputted from the resampler into OQAM real/imaginary component signals;

a high pass filter performing a high-passband-filtering to the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data section;

a squarer for squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high passband filter, and adding and outputting the calculation;

a pre-filter for passing only a frequency of a particular band to recover the symbol clock from the output of the squarer;

a timing error detector for detecting timing error information from the output of the pre-filter;

a filtering member for filtering only the low passband signal from the timing error information outputted from the timing error detector; and

an NCO for generating at least two times the frequency of the symbol clock recovered according to low passband signals of the filtered timing error information and outputting to the first resampler.

7. The digital TV receiver of claim 6, wherein the OQAM converter multiplies digital baseband real/imaginary component signals interpolated and outputted from the resampler by a fixed frequency with a center frequency of 2.690559MHz for converting digital baseband  
5 real/imaginary component signals into the OQAM real/imaginary component signals.

8. The digital TV receiver of claim 1, wherein the symbol clock recovery comprises:  
an OQAM converter for converting each of the digital baseband real/imaginary signals  
outputted from the carrier recovery into OQAM real/imaginary component signals;  
10 a high pass filter performing a high-passband-filtering to the OQAM real/imaginary  
component signals outputted from the OQAM converter for removing information of data  
section;  
a squarer for squaring each of the OQAM real/imaginary component signals filtered by  
and outputted from the high passband filter, and adding and outputting the calculation;  
15 a pre-filter for passing only a frequency of a particular band to recover the symbol clock  
from the output of the squarer;  
a timing error detector for detecting timing error information from the output of the pre-  
filter;  
a filtering member for filtering only the low passband signal from the timing error  
20 information outputted from the timing error detector; and

an NCO for generating at least two times the frequency of the symbol clock recovered according to low passband signals of the filtered timing error information and outputting to the first resampler.

5           9.     The digital TV receiver of claim 8, wherein the OQAM converter multiplies the VSB digital baseband real/imaginary component signals outputted from the carrier recovery by the fixed frequency with a center frequency of 2.690559MHz for converting the VSB digital baseband real/imaginary component signals into the OQAM real/imaginary component signals.

10          10.    A digital TV receiver, comprising:

an A/D converter for taking a sample of a fixed frequency from a VSB type of analog passband signal for converting the signal into a digital passband signal;

a carrier recovery for multiplying the VSB digital passband signal by a standard carrier signal generated from the carrier recovery process for converting the signal into a VSB digital  
15 baseband signal;

a resampler for taking a sample of at least two times the frequency of the symbol clock from the VSB digital baseband real/imaginary signals generated from the carrier recovery so as to interpolate the signals; and

a symbol clock recovery for converting the VSB digital real/imaginary baseband  
20 component signals into OQAM type of real/imaginary component signals, detecting timing error information by high-passband-filtering, squaring, and adding the OQAM real/imaginary signals,

and generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information.

11. The digital TV receiver of claim 10, wherein the symbol clock recovery  
5 comprises:

an OQAM converter for converting each of the digital baseband real/imaginary signals interpolated and outputted from the resampler into OQAM real/imaginary component signals;

a high pass filter performing a high-passband-filtering to the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data  
10 section;

a squarer for squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high passband filter, and adding and outputting the calculation;

a pre-filter for passing only a frequency of a particular band to recover the symbol clock from the output of the squarer;

15 a timing error detector for detecting timing error information from the output of the pre-filter;

a filtering member for filtering only the low passband signal from the timing error information outputted from the timing error detector; and

an NCO for generating at least two times the frequency of the symbol clock recovered  
20 according to low passband signals of the filtered timing error information and outputting to the first resampler.

12. The digital TV receiver of claim 11, wherein the OQAM converter multiplies digital baseband real/imaginary component signals interpolated and outputted from the resampler by a fixed frequency with a center frequency of 2.690559MHz for converting digital baseband real/imaginary component signals into the OQAM real/imaginary component signals.

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13. A digital TV receiver, comprising:

an A/D converter taking a sample of at least two times the frequency of the symbol clock from a VSB analog passband signal for converting the signal into a digital passband signal;

a carrier recovery multiplying the VSB digital passband signal by a standard carrier  
10 signal generated from the carrier recovery process for converting the signal into a VSB digital baseband signal;

a resampler taking a sample of at least two times the frequency of the symbol clock from the VSB digital baseband real/imaginary signals generated from the carrier recovery and interpolating the signals; and

15 a symbol clock recovery for converting the VSB digital baseband real/imaginary component signals into OQAM type of real/imaginary component signals, detecting timing error information by high-passband-filtering, squaring, and adding the OQAM real/imaginary signals, and generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information.

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14. The digital TV receiver of claim 13, wherein the symbol clock recovery comprises:

an OQAM converter for converting each of the VSB digital baseband real/imaginary signals outputted from the carrier recovery into OQAM real/imaginary component signals;

a high pass filter performing a high-passband-filtering to the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data  
5 section;

a squarer for squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high passband filter, and adding and outputting the calculation;

a pre-filter for passing only a frequency of a particular band to recover the symbol clock from the output of the squarer;

10 a timing error detector for detecting timing error information from the output of the pre-filter;

a filtering member for filtering only the low passband signal from the timing error information outputted from the timing error detector; and

an NCO for generating at least two times the frequency of the symbol clock recovered  
15 according to low passband signals of the filtered timing error information and outputting to the first resampler.

15. The digital TV receiver of claim 14, wherein the OQAM converter multiplies the VSB digital baseband real/imaginary component signals outputted from the carrier recovery by  
20 the fixed frequency with a center frequency of 2.690559MHz for converting the VSB digital baseband real/imaginary component signals into the OQAM real/imaginary component signals.